Southeast Leg Wetland Pond Area Field Sampling Plan and
Quality Assurance Project Plan Addendum
Hatco Site – Fords, New Jersey
January 2020

1. Problem Definition

Weston Solutions, Inc. (Weston®) has prepared this Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP) Addendum to describe investigation activities in the portion of the Hatco Remediation Site designated as AOC-2 Former Ponds Area, Southeast Leg (SEL) Wetland Pond Area. This document is intended as an addendum to the project QAPP originally prepared as part of Weston's 2009 *Addendum 3 to the Consolidated Remedial Action Work Plan (RAWP),* and provides specific sample collection methodology and laboratory analyses requirements.

The primary intent of this program is to delineate the extent of soil and/or surface water contamination in the recently reconstructed wetlands in the SEL Remediation Area. Remediation in the SEL Wetland Pond Area was performed in 2015, and included excavation and offsite disposal of light non-aqueous phase liquid (LNAPL) and soil containing polychlorinated biphenyls (PCBs) and bis(2-ethylhexyl) phthalate (BEHP). Post-remediation soil samples confirmed removal of PCBs above the remediation goal of 2 mg/kg and BEHP above the remediation goal of 210 mg/kg, to the limits of the excavation. The SEL Wetland Pond Area was then backfilled with imported clean fill. The area was restored as a wetland in accordance with the approved wetland disruption permit for this area.

On June 19, 2018, Weston personnel conducting remediation activities in the AOC-2 Former Ponds Area of the Hatco Site discovered that a hole had formed in the ground adjacent to a facility standpipe. The standpipe was connected to a stormwater sewer line which ran through an area of contaminated soil. The contaminated soil was placed as part of the Southeast Leg (SEL) remediation project and consolidated beneath an engineered cap. The area acted as a pathway for contaminated soil to be transported to the ground surface and into the reconstructed wetlands. Sheen was observed on portions of the northern and southern edges of the SEL Wetland Pond Area. The majority of the sheen was observed across an approximately 800 square-foot area within roughly ten feet of the southern edge of the pond. The heavy sheen was recovered by Weston personnel using sorbent materials.

Weston plans to implement a multiple-phase sampling approach to:

1. Identify contaminants present at concentrations above applicable remediation criteria;
2. Determine the extent of soil contamination; and
3. Delineate the impacts that require remediation.

Results of this sampling program will be used to define the horizontal and vertical limits of possible contaminated soil to be removed from this area.

2. Project Data Quality Objectives

The following data quality objectives have been established for this work:

- Sensitivity Data Quality Objectives (DQO): Reporting limits will be below the site-specific criteria summarized in ***Table 1: Site-Specific Direct Contact Soil Remediation Criteria.***

- Accuracy, precision, representativeness, completeness and comparability goals will be as stated in Weston's *2009 Addendum 3 to the Consolidated RAWP*.

Weston will communicate project-specific DQO to the analytical laboratory.

3. Sample Design, Rationale and Locations

Soil samples will be collected to define the extent of soil contamination at the SEL Wetland Pond Area. Sampling will be performed in three phases to: 1) identify contaminants associated with the sewer release; 2) identify contaminants which have impacted the clean fill used to construct the SEL Wetlands in 2015; and 3) delineate the extent of impacts which require remediation. One surface water sample will be collected to evaluate the effect of the contaminants upon surface water quality. Each sampling location will be photographed and documented with a field sketch. If a location is inaccessible then the final location may be adjusted based on field conditions. ***Figure 1: Southeast Leg Pond Area Sewer Line Release Sampling*** is an overall site map showing the location of the soil and surface water samples. No permitting will be required for sampling.

3.1 Phase 1: Identify Contaminants

Phase 1 will consist of identifying contaminants associated with the sewer release. Weston will collect six surface soil samples and one surface water sample for laboratory analysis as described on ***Table 3: Sample Summary*****,** using a standard laboratory turnaround time. Sample results will be compared to site specific criteria. Applicable criteria for the Hatco Site are defined in the RAWP and United States Environmental Protection Agency (USEPA) Risk-Based PCB Disposal Approval. Direct contact soil criteria are the New Jersey Department of Environmental Protection (NJDEP) soil cleanup criteria subject to the NJDEP Order of Magnitude Guidance, updated August 10, 2009. Applicable criteria are summarized on ***Table 1.***

Two soil samples will be collected along the apparent pathway from the original release leading to the pond; four soil samples will be collected from the north, east, south and west perimeter of the pond at the approximate water line; and one surface water sample will be collected from the south end of the pond where a visible sheen was previously identified. Soil samples will be collected from the 0- to 6-inch depth interval. Planned sample locations are shown on ***Figure 1***. These locations are subject to adjustment based on field observations.

3.2 Phase 2: Determine Extent of Soil Contamination

Phase 2 will consist of determining the impact of contaminants identified in the Phase 1 sampling upon the clean fill used to construct the SEL Wetlands in 2015. If any contaminants are identified above a standard by Phase 1 sampling, Weston will implement Phase 2. Weston will collect soil samples at 15-foot intervals along the apparent pathway from the original release to the pond and around the perimeter of the pond at the approximate water line. Samples will be analyzed for the potential contaminants identified in Phase 1. Sample results will be compared to the remediation criteria for the site summarized on ***Table 1.***

Contaminants detected in the SEL Wetland Pond Area at concentrations greater than the Non-Residential Direct Contact Soil Cleanup Criteria (NRDCSCC) are subject to remediation by removal. Contaminants detected at concentrations less than the NRDCSCC but greater than the Residential Direct Contact Soil Cleanup Criteria (RDCSCC) will be managed through a deed notice to be established for the entire site.

3.3 Phase 3: Determine the Extent of Impacts Which Require Remediation

Phase 3 will consist of determining the extent of impacts which require remediation. Horizontal step-out samples will be collected at approximately 5-foot intervals, as necessary, to delineate contamination at locations identified during Phase 2 sampling.

4. Key Project Personnel and Contact Information

Name	Title	Cell Phone	Email
Jason Schindler	Principal Project Manager	(732) 740-5529	Jason.schindler@westonsolutions.com
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Aaron Roppoli	Associate Geoscientist/Site Safety Officer	(251) 751-2882	Aaron.Roppoli@WestonSolutions.com
Habib Bravo-Ruiz	Associate Geoscientist	(787) 360-4156	Habib.Bravo-Ruiz@WestonSolutions.com
Eliel Lucero	Project Scientist	(908) 229-3614	Eliel.Lucero@WestonSolutions.com
Larry Werts	Health and Safety Coordinator	(215) 815-6237	Lawrence.Werts@WestonSolutions.com
Yunru Yang	Quality Assurance Coordinator	(732) 417-5822	Yunru.Yang@WestonSolutions.com
Patricia Greico	Laboratory Contact	(732) 593-2507	Patricia.Greico@testamericainc.com

5. Sampling Methodology

The sampling procedures will follow the guidelines documented in the *NJDEP Field Sampling Procedures Manual* (August 2005) as described below, and are detailed in Weston's 2009 QAPP. Lithologic descriptions and field observations will be recorded in the field logbook. Soil samples will be collected from discrete 6-inch intervals from designated depths, as outlined in ***Table 1.***

5.1 Soil Sampling

The sampling team will navigate to the target sample locations using the coordinates identified on ***Table 2: Field Sampling Plan*** and handheld Global Positioning System (GPS) navigational equipment. Soil samples for non-VOC analysis will be collected from the top 6 inches using dedicated disposable high density polyethylene (HDPE) trowels, homogenized in dedicated, disposable aluminum trays, and placed into laboratory-prepared sample containers. EnCore® Samplers will be used to collect soil from the undisturbed soil below the non-VOC sample material for volatile organic analysis. Samples will be preserved as described on ***Table 4: Sample Preservation***.

The following process will be utilized at each sample location to collect the soil samples for laboratory analysis:

1) Set up at the sampling location. A clean sheet of plastic sheeting will be placed over the area and secured.
2) Ensure all necessary supplies are accessible (i.e., disposable aluminum pans, disposable sampling trowels, labeled sample containers, EnCore® samplers, garbage bags, logbook, weather-resistant pen, and required personal protective equipment (PPE) including but not limited to butyl and nitrile gloves, Tychem suits, safety glasses, hard hat, steel-toe boots, etc.).
3) Use dedicated, disposable sampling trowel to collect soil from 0- to 6-inch interval and place soil into dedicated, disposable aluminum tray
4) Screen soil for organic vapors using photoionization detector (PID).
5) Collect soil sample aliquot for VOC analysis from the soil at the bottom of the sample location (approximately 6 inches below grade) using EnCore® sampling device.
6) Homogenize soil sample for non-VOC analysis using trowel. Transfer homogenized soil from aluminum tray to laboratory-prepared sample containers.

7) Place filled sample containers into a cooler with wet ice and a temperature blank for shipment to the laboratory.
8) Containerize used sampling equipment and PPE for disposal.
9) Set up at next sampling location.

5.2 Surface Water Sampling

The sampling team will navigate to the target sample location using the coordinates identified on ***Table 2*** and handheld GPS navigational equipment. The surface water sample will be collected by immersion of the laboratory cleaned sample bottles into the pond. Water sample bottles will be pre-preserved as described on ***Table 4.*** The following process will be utilized to collect the surface water sample for laboratory analysis:

1) Ensure bottles are intact with a good fitting lid.
2) Collect samples for volatile organics analysis first to prevent loss of volatiles due to disturbance of the water. Use a laboratory clean, unpreserved, empty sample jar or a pond sampler to collect surface water and fill pre-preserved vials to zero headspace. Cap vial and invert to ensure no air remains in the vial.
3) For all bottles except samples for volatile organic analysis, proceed to immerse bottle by hand into surface water and allow water to run slowly into bottle until nearly full; do not fill to the point that preservative can wash out of the bottles.
4) Use care not to create sediment disturbance, especially when trace metals sampling is included in the requested analysis.
5) Samples will be placed into a cooler with wet ice and a temperature blank for shipment to the laboratory.
6) Containerize used PPE for disposal.

5.3 Sample Management

The sample bottles will be prepared for shipment accompanied by a chain of custody and the cooler containing them will be custody sealed. The chain of custody will also accompany the bottles during sample collection, transportation back to the laboratory, and analysis. Each form will be completed in the field and signed and dated by a member of the field team who will verify the exact sample shipment.

5.4 Quality Assurance and Quality Control

Quality assurance/quality control (QA/QC) samples will be collected in accordance with Weston's QAPP, included as part of the 2009 Consolidated RAWP *(Addendum 3).* Laboratory-blind field duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples will be collected at a rate of 1 per 20 samples per analytical parameter. Field blanks will be collected once per day per matrix and analyzed for the same parameters as the field samples. A trip blank will accompany the surface water sample for VOC analysis.

Field activities, tests and observations will be recorded in a field logbook. Entries in the logbook will include the names of the individuals participating in the field effort, date and time, and the initials of the individual responsible for recording the observations.

6. Decontamination

Disposable sampling equipment will be used. However, should reusable sampling equipment be used, sampling equipment that comes in contact with contaminated material will be decontaminated prior to reuse and prior to removal from the site. Decontamination will be performed atop a pad or other device to capture all decontamination liquids; these liquids will be containerized for disposal as required in 40 CFR 761.79(g).

Wipe samples will be collected prior to release of decontaminated reusable sampling equipment from the site to document that decontamination is sufficient to meet the requirements of 40 CFR 761.79(b)(3)(i). Wipe testing will be performed in accordance with 40 CFR 761.243, with one wipe sample collected from each unique surface of the decontaminated equipment. One wipe sample will be collected per type of decontaminated equipment.

Once wipe sample results have confirmed decontamination has met the objectives of 40 CFR 761.79(b)(3)(i), the equipment may be released from the site for re-use. Should wipe samples fail to confirm sufficient decontamination, the above process will be repeated.

Reusable sampling equipment employed in areas with PCB concentrations less than 1 mg/kg will be decontaminated in the following sequence, prescribed in the *NJDEP Field Sampling Procedures Manual (August 2005), Section 2.4.1*:

1) Laboratory grade glassware detergent plus tap water wash
2) Generous tap water rinse
3) Distilled and deionized (ASTM Type II) water rinse
4) Acetone (pesticide grade) rinse
5) Total air dry
6) Distilled and deionized (ASTM Type II) water rinse

No confirmatory wipe sampling is required for decontamination of equipment used in areas with PCB concentrations less than 1 mg/kg.

7. Investigation-Derived Waste Management

Investigation-derived waste generated during sampling activities will be containerized and temporarily staged at the Hatco Site, in 55-gallon drums or other DOT-approved containers and handled in accordance with applicable Federal and State requirements.

FIGURES

TABLES

DRAWING TITLE:

Southeast Leg Pond Area
Sewer Line Release Sampling

CLIENT NAME: Hatco

PROJECT NAME: SEL Pond Restoration

N W E S

REPORT DATE: October 2019

PROJECT MANAGER: J. Schindler

DRAWING: 24653_SEL_Pond_FSP_Phase1_2

PATH: P:\Hatco\GIS\MXD\2019_10_SEL_Pond_FSP\

CHECKED BY: C. Devorak

REVISION No.: 0

CONTRACT No.

DELIVERY ORDER NO.

WORK ORDER No.: 13067.001.004.8000

DRAWN/MODIFIED BY: H. Bravo-Ruiz

DATE CREATED: 10/18/2019

FIGURE: 1

SCALE: 1 " = 10 '

DATE: November 2019

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Table 1. Site-Specific Direct Contact Soil Remediation Criteria
Discharge to Restored Wetland
Southeast Leg Remediation Area
Hatco Remediation Project

Contaminant	CASRN	Site Specific RDC	Note	Site Specific NRDC	Note
Volatile Organic Compounds					
Acetone (2-propanone)	67-64-1	70000	(4)	NA	(6)
Acrolein	107-02-8	0.5	(5)	1	(5)
Acrylonitrile	107-13-1	1	(2)	5	(2)
Benzene	71-43-2	3	(2)	13	(2)
Bromodichloromethane (Dichlorobromomethane)	75-27-4	1	(1)	3	(1)
Bromoform	75-25-2	86	(2)	370	(2)
Bromomethane (Methyl bromide)	74-83-9	79	(2)	59	(1)
2-Butanone (Methyl ethyl ketone) (MEK)	78-93-3	3100	(4)	44000	(4)
Carbon disulfide	75-15-0	7800	(5)	110000	(5)
Carbon tetrachloride	56-23-5	2	(2)	4	(2)
Chlorobenzene	108-90-7	510	(4)	7400	(4)
Chloroethane (Ethyl chloride)	75-00-3	220	(5)	1100	(5)
Chloroform	67-66-3	0.6	(1)	2	(1)
Chloromethane (Methyl chloride)	74-87-3	4	(1)	12	(1)
1,2-Dibromo-3-chloropropane	96-12-8	0.08	(5)	0.2	(5)
Dibromochloromethane (Chlorodibromomethane)	124-48-1	3	(1)	8	(1)
1,2-Dibromoethane	106-93-4	0.008	(5)	0.04	(5)
1,3-Dichlorobenzene (m-Dichlorobenzene)	541-73-1	5300	(4)	59000	(4)
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	5300	(4)	59000	(4)
1,4-Dichlorobenzene (p-Dichlorobenzene)	106-46-7	5	(1)	13	(1)
Dichlorodifluoromethane	75-71-8	490	(5)	230000	(5)
1,1-Dichloroethane	75-34-3	8	(1)	24	(1)
1,2-Dichloroethane	107-06-2	6	(2)	24	(2)
1,1-Dichloroethene	75-35-4	11	(4)	150	(2)
1,2-Dichloroethene (cis) (c-1,2-Dichloroethylene)	156-59-2	230	(4)	1000	(2)
1,2-Dichloroethene (trans) (t-1,2-Dichloroethylene)	156-60-5	1000	(2)	1000	(2)
1,2-Dichloropropane	78-87-5	10	(2)	43	(2)
1,3-Dichloropropene (cis and trans)	542-75-6	4	(2)	7	(4)
Ethyl benzene	100-41-4	7800	(4)	110000	(4)
Methyl acetate	79-20-9	78000	(5)	NA	(6)
Methyl tert-butyl ether (MTBE)	1634-04-4	110	(5)	320	(5)
4-Methyl-2-pentanone (MIBK)	108-10-1	NA	(6)	NA	(6)
Methylene chloride (Dichloromethane)	75-09-2	49	(2)	230	(4)
Styrene	100-42-5	90	(4)	260	(4)
Tertiary butyl alcohol (TBA)	75-65-0	1400	(5)	11000	(5)
1,1,1,2-Tetrachloroethane	630-20-6	1	(1)	1	(1)
1,1,2,2-Tetrachloroethane	79-34-5	1	(1)	3	(1)
Tetrachloroethene (PCE) (Tetrachloroethylene)	127-18-4	43	(4)	1500	(4)
Toluene	108-88-3	6300	(4)	91000	(4)
1,2,4-Trichlorobenzene	120-82-1	73	(4)	1200	(2)
1,1,1-Trichloroethane	71-55-6	NA	(3)	NA	(3)
1,1,2-Trichloroethane	79-00-5	2	(1)	6	(1)
Trichloroethene (Trichloroethylene) (TCE)	79-01-6	23	(2)	54	(2)
Trichlorofluoromethane	75-69-4	23000	(5)	340000	(5)
Vinyl chloride	75-01-4	2	(2)	7	(2)
Xylenes (Total)	1330-20-7	12000	(4)	170000	(4)

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Southeast Leg Remediation Area
Hatco Remediation Project

Contaminant	CASRN	Site Specific RDC	Note	Site Specific NRDC	Note
Semi-Volatile Organic Compounds					
Acenaphthene	83-32-9	3400	(2)	37000	(4)
Acenaphthylene	208-96-8	NA	(6)	300000	(5)
Acetophenone	98-86-2	2	(5)	5	(5)
Anthracene	120-12-7	17000	(4)	30000	(4)
Atrazine	1912-24-9	210	(5)	2400	(5)
Benzaldehyde	100-52-7	6100	(5)	68000	(5)
Benzidine	92-87-5	0.7	(5)	0.7	(5)
Benzo(a)anthracene (1,2-Benzanthracene)	56-55-3	5	(4)	17	(4)
Benzo(a)pyrene (BaP)	50-32-8	0.66	(2)	2	(4)
Benzo(b)fluoranthene (3,4-Benzofluoranthene)	205-99-2	5	(4)	17	(4)
Benzo(ghi)perylene	191-24-2	380000	(5)	30000	(5)
Benzo(k)fluoranthene	207-08-9	45	(4)	170	(4)
Benzyl Alcohol	100-51-6	NA	(6)	NA	(6)
1,1'-Biphenyl	92-52-4	61	(5)	240	(5)
Bis(2-chloroethyl)ether	111-44-4	0.66	(2)	3	(2)
Bis(2-chloroisopropyl)ether	108-60-1	23	(1)	67	(1)
Bis(2-ethylhexyl) phthalate	117-81-7	49	(2)	210	(2)
Butyl benzyl phthalate	85-68-7	1200	(4)	14000	(4)
Caprolactam	105-60-2	31000	(5)	340000	(5)
Carbazole	86-74-8	24	(5)	96	(5)
4-Chloro-3-methyl phenol (p-Chloro-m-cresol)	59-50-7	NA	(6)	NA	(6)
4-Chloroaniline (p-Chloroaniline)	106-47-8	NA	(6)	NA	(6)
2-Chlorophenol (o-Chlorophenol)	95-57-8	310	(4)	5200	(2)
Dibenz(a,h)anthracene	53-70-3	0.66	(2)	2	(4)
3,3'-Dichlorobenzidine	91-94-1	2	(2)	6	(2)
2,4-Dichlorophenol	120-83-2	180	(4)	3100	(2)
Diethyl phthalate	84-66-2	49000	(4)	550000	(4)
2,4-Dimethyl phenol	105-67-9	1200	(4)	14000	(4)
Dimethyl phthalate	131-11-3	NA	(6)	NA	(6)
Di-n-butyl phthalate	84-74-2	6100	(4)	68000	(4)
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	6	(5)	68	(5)
2,4-Dinitrophenol	51-28-5	120	(4)	2100	(2)
2,6-Dinitrotoluene	606-20-2	0.7	(5)	3	(5)
2,4-Dinitrotoluene	121-14-2	0.7	(5)	3	(5)
2,4-Dinitrotoluene/2,6-Dinitrotoluene (mixture)	25321-14-6	1	(2)	4	(2)
Di-n-octyl phthalate	117-84-0	2400	(4)	27000	(4)
1,2-Diphenylhydrazine	122-66-7	0.7	(5)	2	(5)
Fluoranthene	206-44-0	2300	(2)	24000	(4)
Fluorene	86-73-7	2300	(2)	24000	(4)
Hexachloro-1,3-butadiene	87-68-3	6	(4)	25	(4)
Hexachlorobenzene	118-74-1	0.66	(2)	2	(2)
Hexachlorocyclopentadiene	77-47-4	400	(2)	110	(1)
Hexachloroethane	67-72-1	12	(4)	100	(2)
Indeno(1,2,3-cd)pyrene	193-39-5	5	(4)	17	(4)
Isophorone	78-59-1	1100	(2)	10000	(2)
2-Methylnaphthalene	91-57-6	230	(5)	2400	(5)
2-Methylphenol (o-creosol)	95-48-7	310	(1)	10000	(2)

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Contaminant	CASRN	Site Specific RDC	Note	Site Specific NRDC	Note
4-Methylphenol (p-creosol)	106-44-5	31	(1)	340	(1)
Naphthalene	91-20-3	6	(1)	17	(1)
2-Nitroaniline	88-74-4	39	(5)	23000	(5)
Nitrobenzene	98-95-3	28	(2)	14	(1)
N-Nitrosodimethylamine	62-75-9	0.7	(5)	0.7	(5)
N-Nitrosodi-n-propylamine	621-64-7	0.66	(2)	0.66	(2)
N-Nitrosodiphenylamine	86-30-6	140	(2)	600	(2)
Pentachlorophenol	87-86-5	6	(2)	24	(2)
Phenanthrene	85-01-8	NA	(6)	300000	(5)
Phenol	108-95-2	18000	(4)	210000	(4)
Pyrene	129-00-0	1700	(2)	18000	(4)
2,4,5-Trichlorophenol	95-95-4	6100	(4)	68000	(4)
2,4,6-Trichlorophenol	88-06-2	62	(2)	270	(2)
Pesticides and PCBs					
Aldrin	309-00-2	0.04	(2)	0.2	(4)
Chlordane (alpha and gamma)	57-74-9	0.2	(5)	1	(5)
4,4'-DDD (p,p'-TDE)	72-54-8	3	(2)	13	(4)
4,4'-DDE (p,p'-DDX)	72-55-9	2	(2)	9	(2)
4,4'-DDT	50-29-3	2	(2)	9	(2)
Dieldrin	60-57-1	0.042	(2)	0.2	(4)
Endosulfan I and Endosulfan II (alpha and beta)	115-29-7	470	(4)	6800	(4)
Endosulfan sulfate	1031-07-8	470	(5)	6800	(5)
Endrin	72-20-8	23	(4)	340	(4)
alpha-HCH (alpha-BHC)	319-84-6	0.1	(5)	0.5	(5)
beta-HCH (beta-BHC)	319-85-7	0.4	(5)	2	(5)
Heptachlor	76-44-8	0.15	(2)	0.7	(4)
Heptachlor epoxide	1024-57-3	0.07	(5)	0.3	(5)
Lindane (gamma-HCH) (gamma-BHC)	58-89-9	0.52	(2)	2.2	(2)
Methoxychlor	72-43-5	390	(4)	5700	(4)
Polychlorinated biphenyls (PCBs)	1336-36-3	0.49	(2)	2	(2)
Toxaphene	8001-35-2	0.6	(4)	3	(4)
Inorganics					
Aluminum	7429-90-5	78000	(5)	NA	(6)
Antimony	7440-36-0	31	(4)	450	(4)
Arsenic	7440-38-2	20	(2)	20	(2)
Barium	7440-39-3	16000	(4)	59000	(4)
Beryllium	7440-41-7	16	(4)	140	(4)
Cadmium	7440-43-9	78	(4)	100	(2)
Chromium – hexavalent (VI)	18540-29-9	NA	(6)	NA	(6)
Chromium – trivalent (III)	16065-83-1	NA	(6)	NA	(6)
Chrysene	218-01-9	450	(4)	1700	(4)
Cobalt	7440-48-4	1600	(5)	590	(5)
Copper	7440-50-8	3100	(4)	45000	(4)
Cyanide	57-12-5	47	(1)	680	(1)
Lead	7439-92-1	400	(2)	800	(4)
Manganese	7439-96-5	11000	(5)	5900	(5)
Mercury	7439-97-6	23	(4)	270	(2)
Nickel (Soluble salts)	7440-02-0	1600	(4)	23000	(4)

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Hatco Remediation Project

Contaminant	CASRN	Site Specific RDC	Note	Site Specific NRDC	Note
Selenium	7782-49-2	390	(4)	5700	(4)
Silver	7440-22-4	390	(4)	5700	(4)
Thallium	7440-28-0	NA	(3)	NA	(6)
Vanadium	7440-62-2	370	(2)	7100	(2)
Zinc	7440-66-6	23000	(4)	110000	(4)

Notes:
All criteria in milligrams per kilogram dry weight basis
NA: Not applicable
CASRN: Chemical Abstracts Service Registry Number
NRDC: Non-Residential Direct Contact
RDC: Residential Direct Contact
SCC: Soil Cleanup Criteria
SRS: Soil Remediation Standard
(1): Change to SRS greater than one order of magnitude; SRS applies.
(2): Change to SRS less than one order of magnitude; SCC retained.
(3): Contaminant no longer regulated
(4): Less stringent SRS standard applied
(5): No applicable SCC, SRS applied
(6): Not a suspected site-related contaminant, no current SRS

L:\13067 Hatco\12.0 Preliminary Documents\2019-11 SEL Pond Restoration Planning\Field Sampling Plan\[2019-12-12 SEL Pond FSP Table 1-Soil Crite

Table 2. Field Sampling Plan
Discharge to Restored Wetland
Southeast Leg Remediation Area
Hatco Remedation Project

Sampling Phase	Target Northing	Target Easting	Location	Sample Depth (feet)	Sample ID	Delineation Goal
Phase 1	614514	542588	SEL-PA-SB01	0.0 - 0.5	SEL-PA-SB01-A-B-0-MMDDYY	Surface soil/Sewer release pathway
	614476	542597	SEL-PA-SB02	0.0 - 0.5	SEL-PA-SB02-A-B-0-MMDDYY	Surface soil/Sewer release pathway
	542587	614417	SEL-PA-SBNo	0.0 - 0.5	SEL-PA-SBNo-A-B-0-MMDDYY	Surface soil
	542648	614340	SEL-PA-SBEa	0.0 - 0.5	SEL-PA-SBEa-A-B-0-MMDDYY	Surface soil
	542592	614265	SEL-PA-SBSo	0.0 - 0.5	SEL-PA-SBSo-A-B-0-MMDDYY	Surface soil
	542524	614339	SEL-PA-SBWe	0.0 - 0.5	SEL-PA-SBWe-A-B-0-MMDDYY	Surface soil
	542592	614267	SEL-PA-SW01	--	SEL-PA-SW01-0-MMDDYY	Surface water sample
Phase 2	542597	614411	SEL-PA-SB03	0.0 - 0.5	SEL-PA-SB03-A-B-0-MMDDYY	Surface soil
	542606	614399	SEL-PA-SB04	0.0 - 0.5	SEL-PA-SB04-A-B-0-MMDDYY	Surface soil
	542615	614387	SEL-PA-SB05	0.0 - 0.5	SEL-PA-SB05-A-B-0-MMDDYY	Surface soil
	542623	614374	SEL-PA-SB06	0.0 - 0.5	SEL-PA-SB06-A-B-0-MMDDYY	Surface soil
	542633	614362	SEL-PA-SB07	0.0 - 0.5	SEL-PA-SB07-A-B-0-MMDDYY	Surface soil
	542642	614351	SEL-PA-SB08	0.0 - 0.5	SEL-PA-SB08-A-B-0-MMDDYY	Surface soil
	542657	614310	SEL-PA-SB09	0.0 - 0.5	SEL-PA-SB09-A-B-0-MMDDYY	Surface soil
	542651	614296	SEL-PA-SB10	0.0 - 0.5	SEL-PA-SB10-A-B-0-MMDDYY	Surface soil
	542643	614285	SEL-PA-SB11	0.0 - 0.5	SEL-PA-SB11-A-B-0-MMDDYY	Surface soil
	542631	614276	SEL-PA-SB12	0.0 - 0.5	SEL-PA-SB12-A-B-0-MMDDYY	Surface soil
	542617	614271	SEL-PA-SB13	0.0 - 0.5	SEL-PA-SB13-A-B-0-MMDDYY	Surface soil
	542603	614266	SEL-PA-SB14	0.0 - 0.5	SEL-PA-SB14-A-B-0-MMDDYY	Surface soil
	542573	614263	SEL-PA-SB15	0.0 - 0.5	SEL-PA-SB15-A-B-0-MMDDYY	Surface soil
	542559	614259	SEL-PA-SB16	0.0 - 0.5	SEL-PA-SB16-A-B-0-MMDDYY	Surface soil
	542544	614258	SEL-PA-SB17	0.0 - 0.5	SEL-PA-SB17-A-B-0-MMDDYY	Surface soil
	542534	614267	SEL-PA-SB18	0.0 - 0.5	SEL-PA-SB18-A-B-0-MMDDYY	Surface soil
	542529	614282	SEL-PA-SB19	0.0 - 0.5	SEL-PA-SB19-A-B-0-MMDDYY	Surface soil
	542525	614296	SEL-PA-SB20	0.0 - 0.5	SEL-PA-SB20-A-B-0-MMDDYY	Surface soil
	542522	614311	SEL-PA-SB21	0.0 - 0.5	SEL-PA-SB21-A-B-0-MMDDYY	Surface soil
	542522	614326	SEL-PA-SB22	0.0 - 0.5	SEL-PA-SB22-A-B-0-MMDDYY	Surface soil
	542533	614369	SEL-PA-SB23	0.0 - 0.5	SEL-PA-SB23-A-B-0-MMDDYY	Surface soil
	542542	614381	SEL-PA-SB24	0.0 - 0.5	SEL-PA-SB24-A-B-0-MMDDYY	Surface soil
	542550	614393	SEL-PA-SB25	0.0 - 0.5	SEL-PA-SB25-A-B-0-MMDDYY	Surface soil
	542558	614406	SEL-PA-SB26	0.0 - 0.5	SEL-PA-SB26-A-B-0-MMDDYY	Surface soil
	542569	614416	SEL-PA-SB27	0.0 - 0.5	SEL-PA-SB27-A-B-0-MMDDYY	Surface soil
	542526	614354	SEL-PA-SB28	0.0 - 0.5	SEL-PA-SB28-A-B-0-MMDDYY	Surface soil
	542653	614325	SEL-PA-SB29	0.0 - 0.5	SEL-PA-SB29-A-B-0-MMDDYY	Surface soil
	614435	542589	SEL-PA-SB30	0.0 - 0.5	SEL-PA-SB30-A-B-0-MMDDYY	Surface soil/Sewer release pathway
	614446	542595	SEL-PA-SB31	0.0 - 0.5	SEL-PA-SB31-A-B-0-MMDDYY	Surface soil/Sewer release pathway
	614453	542594	SEL-PA-SB32	0.0 - 0.5	SEL-PA-SB32-A-B-0-MMDDYY	Surface soil/Sewer release pathway
	614461	542595	SEL-PA-SB33	0.0 - 0.5	SEL-PA-SB33-A-B-0-MMDDYY	Surface soil/Sewer release pathway
	614488	542591	SEL-PA-SB34	0.0 - 0.5	SEL-PA-SB34-A-B-0-MMDDYY	Surface soil/Sewer release pathway
	614503	542586	SEL-PA-SB35	0.0 - 0.5	SEL-PA-SB35-A-B-0-MMDDYY	Surface soil/Sewer release pathway

Notes:
Target Northing and Easting in New Jersey State Plane Coordinates

L:\13067 Hatco\12.0 Preliminary Documents\2019-11 SEL Pond Restoration Planning\Field Sampling Plan\[2019-12-12 SEL Pond FSP Table 2, 3, 4.xlsx]Table 2 Samples

Table 3. Sample Summary Table
Discharge to Restored Wetland
Southeast Leg Remediaton Area
Hatco Remediation Project

Matrix	Analytical Method	Parameter	No. of Samples	No. of Trip Blanks	Frequency of Trip Blanks	No. of Field Blanks[a]	Frequency of Field Blanks	No. of Laboratory-Blind Duplicate Samples[b]	Frequency of Laboratory-Blind Duplicate Samples	No. of MS/MSD Samples	Frequency of MS/MSD Samples	Comments
Phase 1 - Surface Water	245.1	Mercury	1	0		1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
	335.4	Cyanide, Total	1	0		1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
	335.4	Cyanide amenable	1	0		1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
	6020B	TAL Metals	1	0		1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
	8081B	TCL Pesticides	1	0		1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
	8151A	TCL Herbicides	1	0		1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
	8082A	PCBs	1	0		1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
	8260D	TCL VOCs + TICs	1	1	1 per sample shipment	1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
	8270E_SIM	SVOC - SIM Analytes	1	0		1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
	8270E	TCL SVOC + TICs	1	0		1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
	218.6 / 7196A / 7199	Hexavalent Chromium	1	0		1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
	8015B(M)	EPH	1	0		1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
	Field measurement	pH	1	0		1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
Phase 1 - Soil	8082A	PCBs	6	0		1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
	6010D	TAL Metals	6	0		1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
	8081B	TCL Pesticides	6	0		1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
	8151A	TCL Herbicides	6	0		1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
	7471B	Mercury	6	0		1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
	8260D	TCL VOCs + TICS	6	0		1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
	8270E	TCL SVOCs + TICs	6	0		1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
	9012B	Cyanide	6	0		1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
	7199 / 3060A	Hexavalent Chromium	6	0		1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
	8015B(M)	EPH	6	0		1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
	9045D	pH	6	0		1	1 per day	1	1 per 20 analyzed	1	1 per batch of 20 samples	Analyze immediately
Phase 2 - Soil (collect if exceedance(s) in Phase 1 samples)	8082A	PCBs	33	0		2	1 per day	2	1 per 20 analyzed	2	1 per batch of 20 samples	Analyses to be determined by Phase 1 results
	6010D	TAL Metals	33	0		2	1 per day	2	1 per 20 analyzed	2	1 per batch of 20 samples	
	8081B	TCL Pesticides	33	0		2	1 per day	2	1 per 20 analyzed	2	1 per batch of 20 samples	
	8151A	TCL Herbicides	33	0		2	1 per day	2	1 per 20 analyzed	2	1 per batch of 20 samples	
	7471B	Mercury	33	0		2	1 per day	2	1 per 20 analyzed	2	1 per batch of 20 samples	
	8260D	TCL VOCs + TICS	33	0		2	1 per day	2	1 per 20 analyzed	2	1 per batch of 20 samples	
	8270E	TCL SVOCs + TICs	33	0		2	1 per day	2	1 per 20 analyzed	2	1 per batch of 20 samples	
	9010C	Cyanide	33	0		2	1 per day	2	1 per 20 analyzed	2	1 per batch of 20 samples	
	7199 / 3060A	Hexavalent Chromium	33	0		2	1 per day	2	1 per 20 analyzed	2	1 per batch of 20 samples	
	8015B(M)	EPH	33	0		2	1 per day	2	1 per 20 analyzed	2	1 per batch of 20 samples	
	9045D	pH	33	0		2	1 per day	2	1 per 20 analyzed	2	1 per batch of 20 samples	

Notes:

A trip blank will accompany the surface water sample for VOC analysis.

[a] Total number of field blanks is dependent upon the duration of the sampling event.

°C	Degrees Celsius
EPH	Extractable petroleum hydrocarbons
g	gram
mL	milliliter
MS/MSD	Matrix spike/matrix spike duplicate sample
oz	ounce
PCBs	Total Polychlorinated Biphenyls
SIM	Selected-Ion Monitoring
SVOCs	Semi-Volatile Organic Compounds
TAL	Target Analyte List
TCL	Target Compound List
TICs	Tentatively Identified Compounds
VOCs	Volatile Organic Compounds

Table 4. Sample Preservation Table
Discharge to Restored Wetland
Southeast Leg Remediation Area
Hatco Remediation Project

Matrix	Parameters	Sample Container*	Minimum Mass (g)	Analytical Method	Sample Preservation	Holding Time
Surface Water	Mercury	250 mL HDPE	100	245.1	HNO_3 to pH < 2	28 days
	Cyanide-total	1 L HPDE	500	SM4500-CN^- C/E	Cool to 4°C ± 2°C, NaOH to pH > 12, 0.6g ascorbic acid	14 days
	Cyanide amenable	1 L HPDE	500	SM4500-CN^- G	Cool to 4°C ± 2°C, NaOH to pH > 12, 0.6g ascorbic acid	14 days
	TAL Metals	250 mL HDPE	100	6020B	Ultra HNO_3 to pH < 2	180 days
	TCL Pesticides	1 L amber glass	1000	8081B	Cool to 4°C ± 2°C	7 days to extraction; 40 days from extraction to analysis
	TCL Herbicides	1 L amber glass	1000	8151A	Cool to 4°C ± 2°C	7 days to extraction; 40 days from extraction to analysis
	PCBs	1 L amber glass	1000	8082A	Cool to 4°C ± 2°C	7 days to extraction; 40 days from extraction to analysis
	TCL VOCs + TICs	3 x 40 mL VOA vials	40	8260D	Cool to 4°C ± 2°C, HCl to pH < 2 (no headspace)	14 days
	SVOC - SIM Analytes	1 L amber glass	1000	8270E_SIM	Cool to 4°C ± 2°C	7 days to extraction; 40 days from extraction to analysis
	TCL SVOCs + TICs	1 L amber glass	1000	8270E	Cool to 4°C ± 2°C	7 days to extraction; 40 days from extraction to analysis
	Hexavalent Chromium	250 mL HDPE	200	218.6 / 7196A / 7199	Cool to 4°C ± 2°C	24 hours
	EPH	500 mL amber glass	500	8015B(M)	Cool to 4°C ± 2°C, H_2SO_4	14 days to extraction; 40 days from extraction to analysis
	pH	field measurement	50	field measurement	field measurement	15 minutes
Soil	PCBs	4 oz glass w/Teflon lid	20	8082A	Cool to 4°C ± 2°C	14 days to extraction; 40 days from extraction to analysis
	TAL Metals	4 oz glass w/Teflon lid	2	6010D	None	180 days
	TCL Pesticides	4 oz glass w/Teflon lid	20	8081B	Cool to 4°C ± 2°C	14 days to extraction; 40 days from extraction to analysis
	TCL Herbicides	4 oz glass w/Teflon lid	50	8151A	Cool to 4°C ± 2°C	14 days to extraction; 40 days from extraction to analysis
	Mercury	4 oz glass w/Teflon lid	28	7471B	None	28 days
	TCL VOCs + TICs	3 EnCore® Samplers	3/sample	8260D	Cool to 4°C ± 2°C	48 hours for extraction; 14 days for analysis
	TCL SVOCs + TICs	4 oz glass w/Teflon lid	20	8270E	Cool to 4°C ± 2°C	14 days to extraction; 40 days from extraction to analysis
	Cyanide	4 oz glass w/Teflon lid	10	9010C	Cool to 4°C ± 2°C	14 days
	Hexavalent Chromium	4 oz glass w/Teflon lid	10	7199 / 3060A	Cool to 4°C ± 2°C	30 days
	EPH	4 oz glass w/Teflon lid	10	8015B(M)	Cool to 4°C ± 2°C	14 days to extraction; 40 days from extraction to analysis
	pH	4 oz glass w/Teflon lid	20	9045D	Cool to 4°C ± 2°C	24 Hours

Notes:
* Coordinate with laboratory regarding use of discrete sample aliquots for multiple analyses.

°C	Degrees Celsius
g	gram
EPH	Extractable petroleum hydrocarbons
HDPE	high density polyethylene
HNO_3	Nitric acid
H_2SO_4	Sulfuric acid
L	liter
mL	milliliter
oz	ounce
NaOH	Sodium hydroxide
PCBs	Total Polychlorinated Biphenyls
SIM	Selected-Ion Monitoring
SVOCs	Semi-Volatile Organic Compounds
TAL	Target Analyte List
TCL	Target Compound List
TICs	Tentatively Identified Compounds
VOCs	Volatile Organic Compounds

L:\13067 Hatco\12.0 Preliminary Documents\2019-11 SEL Pond Restoration Planning\Field Sampling Plan\[2019-12-12 SEL Pond FSP Table 2, 3, 4.xlsx]Table 4 Sample Preservation